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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/691,083	10/18/2000	Milton J. Boden JR.	IR1444 Div. (2-2480)	7041
2352	7590	07/25/2005	EXAMINER	
OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403			FOURSON III, GEORGE R	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 07/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/691,083

Applicant(s)

BODEN ET AL.

Examiner

George Fourson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7,9 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,9 and 11-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

The finality of the office action mailed 11/2/04 is withdrawn to correctly indicate the reliance on Wolf, Vol.1, pp.207-210. A copy was previously provided but cited as Wolf, Vol.2 on the PTO-892 mailed 4/29/04. See that attached PTO-892 for the correct citation of the reference.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1,3-7,9 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of Kalnitsky and Wolf et al, Vol.1.

Williams discloses a MOS gated device comprising a p-type substrate 10/20 having substantially flat parallel upper and lower surfaces, a plurality of laterally spaced n-type body regions 82 extending from said upper surface into said substrate, plural p-type source/drain regions 84 formed in each of said body regions in said upper surface of said substrate and defining a respective channel region there between in said upper surface of said body region, a gate electrode 60 comprised of p-type polysilicon including boron dopants (col.2, line 51-col.3, line 2) disposed atop and insulated from said channel region by a gate oxide layer 50 comprising silicon dioxide grown by dry thermal oxidation, one of applicant's preferred methods (instant page 14, lines 8-11), to a thickness of 100-1200Å (col.4, lines 38-40) and operable to invert said channel region in response to the application of a suitable gate voltage to said gate electrode (col.1) and PSG films as interlayer dielectric layer 4 and passivation layer (col.9, lines 39-61). PSG films are encompassed by use of "low temperature oxide".

The reference expresses a preference for gate oxides thicker than 1000Å when using boron, p-type, gates by indicating that thicknesses less than 1000Å are not "entirely satisfactory" and that at thicknesses greater than 1000Å the "risk is reduced" (col.2, lines 52-68) as opposed to disclosing that the process is inoperable using a gate oxide thickness of 1000Å with boron doped gates. Therefor, although not taught as a preferred embodiment, Williams teaches this embodiment nonetheless, and disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. In re Susi, 169 USPQ 423 (CCPA 1971). "A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." In re Gurley, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Merck & Co. v. Biocraft Laboratories, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989). Even a teaching away from a claimed invention does not render the invention patentable. See Celeritas Technologies Ltd. v. Rockwell International Corp., 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir. 1998), where the court held that the prior art anticipated the claims even though it taught away from the claimed invention. "The fact that a modem with a single carrier data signal is shown to be less than optimal does not vitiate the fact that it is disclosed." To further clarify, a prior art opinion that a claimed invention is not preferred for a particular limited purpose, does not preclude utility of the invention for that or another purpose, or even preferability of the invention for another purpose.

Wolf, Vol.1, pp.207-210, discloses dry oxidation at 800-1100°C to produce gate oxides (p.208,210). Williams discloses that the gate oxide 50 is grown typically in a dry thermal oxidation to a thickness of 100-1200Å (col.4, lines 38-40).

It would have been obvious to one of ordinary skill in the art to employ the conditions of Wolf, Vol.1, to enable the disclosed dry oxidation step of Williams to be performed according to the preferred conditions of applicant (see instant page 14).

Williams does not disclose that the gate oxide is radiation hardened.

Kalnitsky discloses a MOS gated semiconductor device comprising gate 16 insulated from a channel region by silicon dioxide gate oxide layer 14 wherein the gate oxide layer is radiation hardened. The reference specifically identifies ionizing radiation as one aspect of the radiation hardening (abstract,col.1, lines 11-65). The teachings of the reference are not limited to any particular thickness of gate oxide and so would be expected to apply to the process of Williams.

It would have been obvious to one of ordinary skill in the art to combine the teachings of Williams and Kalnitsky to provide the gate oxide of Williams with radiation hardening thus reducing the effects of radiation. The gate oxide of the combination would have the recited properties in part because there is no particular degree of radiation hardening recited or frame of reference for the recited amount of radiation hardening recited.

With respect to claim 4, Williams teaches a doping of the n-type channel regions being performed to produce a doping concentration approximately corresponding to use of 100KeV phosphorous implant at $5.5 \text{ E}13 \text{ atoms/cm}^2$ (col.4, lines 15-29).

With respect to claim 5, Williams teaches a doping of the n-type channel regions being performed to produce a doping concentration approximately corresponding to use of 100KeV phosphorous implant at $8 \text{ E}13 \text{ atoms/cm}^2$ (col.4, lines 15-29).

With respect to claim 6, Williams teaches that substrate 10 is more heavily doped than epitaxial layer 20 (col.3, line 66 – col. 4,line 11).

With respect to claim 7, Williams teaches that the body region includes a portion adjacent to the upper surface that is more heavily doped than another portion of the body region, wherein the portion adjacent to the upper surface that is more heavily doped is formed by implantation 94 (fig.7).

With respect to claim 13, Williams teaches that doping conditions of gate electrode being performed to produce a doping concentration approximately corresponding to use of 50 KeV phosphorous implant at 5×10^{15} atoms/cm² by implantation (fig.6).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The cited references on the attached PTO-892 discloses gate oxide formation following source/drain formation.

Applicant states that one of ordinary skill in the art would not have a reasonable expectation of success when combining the teachings of the references as argued above in the statement of the rejections. Applicant also states that one of ordinary skill in the art would not have expected the device of the combination to withstand SEE because of the thickness of the gate oxide employed and would therefore not have been motivated to combine the reference as argued to achieve the results of the instant invention. However, because these statements are conclusory, and not sufficiently probative of the relevant issues, they do not create a material issue of fact on which a reasonable trier of fact could find that the statements are true. Furthermore, it is not necessary that the motivation for combining the references to include expectation of achieving SEE reduction. It is sufficient that there is reason to combine the teachings of the references as stated above and that the resulting device would inherently have the recited properties.

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Applicant does not argue that the device of the combination would not inherently possess the recited property with respect to SEE events.

Applicant's argument regarding the use of the recited thickness of gate oxide in combination with a p-type, boron doped gate in the process of Williams are addressed in the statement of the rejections above. In summary, the use of 1000Å gate oxide in combination with a p-type gate is not taught as a preferred embodiment but is taught as an embodiment nonetheless.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Fourson whose telephone number is (571) 272-1860. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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July 11, 2005